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QUARTERLY

# TECHNICAL STANDARDS *Digest*

VOL. I NO. 4

REA

U.S.D.A.

WASHINGTON 25, D.C.

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## TO OUR READERS

In fulfillment of the aims of this digest we are presenting facts about our projects, our phase of the telephone program and our standardization work. We plan during this year to write a series of descriptions of the characteristics of the standardization function. For example, in this issue, the changing aspect of standardization will be described briefly. Field engineers and the field representatives have been assisting us greatly by sending in via their field reports the technical problems which require attention by the staff of this division. The importance of the reporting of items that lie within the scope of our activities cannot be over-emphasized. In a manner of speaking, the findings on the REA-financed systems constitute a reservoir of data which may serve as the basis for many new ideas and developments for the betterment of rural electric systems.

## STANDARDIZATION IS DYNAMIC

At the outset, it is essential to stress that standardization is not a goal or an end in itself. It is a means, a procedure. Practical standardization is not static, rather it is dynamic. Advances in the science of engineering must be incorporated in the form of revised standards. The standards must keep pace with the science. Standards are not museum pieces. Instead they are up-to-date technical documents which reflect current technical developments and can be relied upon as the standards of the moment.

Since standards and specifications are dynamic in nature, they must be subject to constant study and revision. They must be reviewed periodically in the light of operating experience. As the years go by, the basis upon which a standard was made may change. There are numerous instances which illustrate how the components of a

standard are changed or additions are made to the standards. As the systems' operating problems increase, and as operating conditions of the systems change rapidly, standardization must perform more and more dynamic. True progress is the adjustment to these variations. In the next issue of this digest we will discuss the advantages of standardization.

## ON TECHNICAL PROJECTS

Symmetrical Components-What? A report on neutral shift or voltage rise on 14.4/24.9 kv multigrounded Y distribution systems has been completed and is being printed. The purpose of the study was to obtain design data for use in 14.4/24.9 kv rural distribution systems. This study contributes to the determination of the insulation level which various items of equipment would need on these systems and to ascertain the economies that could be effected in the selection of these items of equipment. Tests were conducted on a 7.2/12.5 kv multigrounded neutral distribution system on the assumption that the characteristics of this present type of system and the proposed 14.4/24.9 kv rural distribution system would be similar enough so that measurements made on a system of one voltage would be applicable to a system of the other voltage. Tests under various conditions show considerable difference in voltage rise on the unfaulted phases. Voltage rises up to 30 percent were measured. However, in instances where the source impedance was substantial, no voltage rise was recorded. Symmetrical components were utilized in obtaining agreement between test results and theoretical calculations.

Evaluation Of Equipment Performance: This study is a systematic and uniform approach to obtaining basic information regarding equipment performance and failure. It will be nation-wide in scope and is



another example of the practical application of sampling techniques to engineering problems pertinent to line construction, operation and maintenance. A simple equipment performance and failure reporting form has been developed and has been field tested for applicability and ease of execution. REA borrowers that have looked over the form have indicated considerable interest in participating in this project. Equipment performance and failure reports coming in from all sections of the country would be analyzed and summaries of such reports would be prepared at various times.

Well--It's Getting Hotter: The study now underway on electric house heating indicates that this use of electricity in rural areas may have considerable effect on the operating costs related to rural distribution systems. The inquiries for data on electric house heating have become more and more numerous. Glass radiant heating panels have elicited a great amount of interest. However, just as in other matters, there are rarely any cure-alls. The high energy consumption and high seasonal demand of this type of heating cannot be ignored and must be taken into account. This applies to the consumer and the cooperative leadership because they are one and the same. A report describing the equipment used in electric radiant house heating is available upon request. It also contains a section on the comparative costs of various methods of heating with different fuels.

Radio Interference Questions? Answers to these questions are being formulated. A draft of a report on this subject has been prepared for comments and review. This interim report presents data on causes of radio interference, methods of location, requirements for a radio interference locator, specifications of available locators and field tests of available locators. Methods are suggested for modification of an automobile radio for interference location. Reports such as these stimulate the development by manufacturers of better equipment. Not only does this type of report affect new developments in power system equipment but also the maintenance of power systems.

## OUR PHASE OF RURAL TELEPHONE PROGRAM

Highlights On Inside Plant Equipment: Design and construction standards for this type of equipment are being developed as follows:

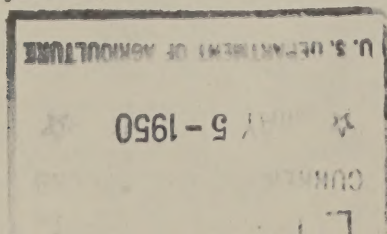
1. Performance specifications on dial central office equipment have been sent to manufacturers in draft form for their review and comment.
2. A draft on manual central office equipment is in process.
3. Data are being obtained on ventilation, heating and wiring requirements for unattended central offices.
4. First draft of specifications for toll boards has been prepared.
5. Comments have been received on the first draft of telephone set specifications. A revised draft will be submitted shortly to manufacturers in the industry for their comments. Subsequent revisions will be necessary, however, in order to resolve all the comments.

Highlights On Outside Plant Equipment:

1. Construction drawings have been prepared for separate open wire line covering nearly every situation. Drawings covering some types of construction for joint use open wire line and aerial cable drawings have been distributed for comments.
2. Studies of joint use of poles and conductors are being made.
3. Drafts of specifications for lead cable, drop wire, and protectors are being prepared.
4. Strength studies of pole and cross-arms have been completed. Other phases of construction specifications for outside plant are under study. Long span line construction is being examined intensively because of the savings in poles and labor costs that would result. High strength conductor will be used in the long span construction.

## WORTHY OF NOTE

Meter School Scheduled: The University of Florida will conduct a course for metermen at the University from May 8 to May 12, 1950. REA borrowers in the Southeast are invited to participate.





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# Digest

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## OUR PHASE OF RURAL TELEPHONE PROGRAM

Development of List Of Acceptable Construction Materials and Equipment: The types of construction materials and equipment needed are determined, to a great extent, by specifications and construction drawings. Until these are established on a stable basis it is not considered practicable to establish a list of acceptable materials and equipment through the Technical Standards Committees. Rather, it has been recommended that systems constructed in the meantime use commercially acceptable materials and equipment which generally comply with our over-all construction specifications and requirements. Major components of equipment and material proposed for use on specific systems will be studied and accepted individually. Over 90 percent of the hardware items required by construction drawings prepared to date have been listed. This list is being circulated to hardware manufacturers in order to acquire information concerning products they manufacture which will be applicable.

Glossary Of Technical Terminology In The Telephone Industry: A compilation, with explanations and definitions, of technical terms commonly used in the telephone industry has been issued. It is being distributed to members of the REA staff by the Personnel Division for training and reference purposes.

Telephone Developments Being Investigated: We are delving into the potentialities of radiotelephone, joint use of plant, and carrier current in the rural telephone program. As the rural telephone program progresses new equipment will be utilized just as in the rural electrification program. Examination is being made of as many

carrier current systems as possible. We are endeavoring to stimulate the development by telephone companies and telephone equipment manufacturers of equipment useful in the rural telephone program. In cooperation with Bell Telephone Laboratories, Inc. we participated in carrier current field strength tests at Celina, Texas. These tests were made by the Bell System at the request of the Federal Communications Commission which has under consideration the question of the licensing and regulation of carrier current frequencies. A decision of the FCC in this matter may greatly affect the application of carrier current techniques to rural power systems.

## WHY STANDARDIZATION?

In the previous issue of the digest we observed that standardization is dynamic. We indicated that a standardization program must be attuned to the development of new materials and equipment and to improved job methods and practices. In this issue we will show the advantages that accrue to REA borrowers through standardization. First, the benefits of mass production in construction are acquired since everyone uses the same types of equipment and the same construction designs. The number of different items required is kept to a minimum. Unnecessary varieties of designs for a type of equipment are eliminated. The best design, all things being considered, is selected. The resultant savings from reduced costs can then be passed on to the ultimate consumers. Second, the development of more effective and safer operation results from the standard location of equipment. Standard construction drawings or plans provide the medium for achieving this objective. Third, standard designs and practices permit maximum



inter-changeability of personnel and equipment in emergencies. Fourth, preparation of specifications outlining the requirements for a particular item of equipment not only facilitates the design requirements but also stimulates competitive bidding by as many of the various suppliers as possible. The increased competition brings about lower prices. Foreexample, it is expected that substantial savings would be effected for REA borrowers by the use of standardized specifications outlining the requirements for substation transformers. Fifth, the interests of REA borrowers are protected by cataloguing standard items via the "List of Materials Acceptable For Use On The Systems of REA Borrowers." Less effective materials, which may lower the standards, cannot be supplied by manufacturers. Sixth, smaller inventories of equipment need be maintained by the borrowers. Thus, requirements are met though fewer items are purchased. Seventh, the establishment of standard designations insures simplicity and uniformity and, thus, greater effectiveness in record-keeping. For example, material item "a" means the same thing to all borrowers, namely, a pin type insulator. Stock cards of all cooperative borrowers are made out on the same basis.

#### NOTES ON TECHNICAL PROJECTS

Underground Corrosion Problems? Excessive corrosion of anchor rods and, at times, ground rods has been reported from a number of widely dispersed areas. Corrosion generally occurs deep in the ground and is attributed to galvanic action. The consequences which may result are serious. Therefore, this project has been given high priority and a report will be issued in the near future. Members of the field staff are urged to include in their field reports descriptions of any occurrences of this nature in their regions.

Outage Monitor - Interim Report: A report on the experimental development of a system outage monitor has been distributed. For several years a manufacturer

has been developing a device to notify the radio dispatcher, maintenance chief, or other office personnel whenever any oil circuit recloser, fuse or sectionalizer locks open on the distribution system. The notification would immediately identify the location of the device which opened. Cooperative personnel would be able to restore service with least delay. Installations on five distribution systems are now being made for test purposes only. The data collected on these test installations will be utilized by the manufacturer to make the necessary modifications to the equipment to assure that it is reliable for service on rural power lines. The equipment has not as yet reached the point of development where it can be offered to REA borrowers as standard equipment.

Electric Water Heater Study Off The Press: Ohio 95 Franklin has cooperated with this division in an investigation conducted to determine the operating characteristics and energy requirements of electric water heaters. Prior to this study and other REA studies there were little basic data on this type of electrical equipment.

#### MERITING MENTION

Application Of Electricity To The Home and Farm: A revised list of about 400 of these applications of electricity has been prepared. Copies will be mailed upon request.

Energy Conversion Factors: The Subcommittee on Energy Conversion Factors of the Inter-Agency River Basin Committee has been determining the need for the establishment of standardized methods of computation and, in addition, appropriate values of the corresponding empirical constants. Data are being collected and will be presented in convenient form for reference. The government agencies which are represented on this Subcommittee are the Departments of Agriculture, Commerce, Interior, the Army Corps of Engineers, and the Federal Power Commission.

